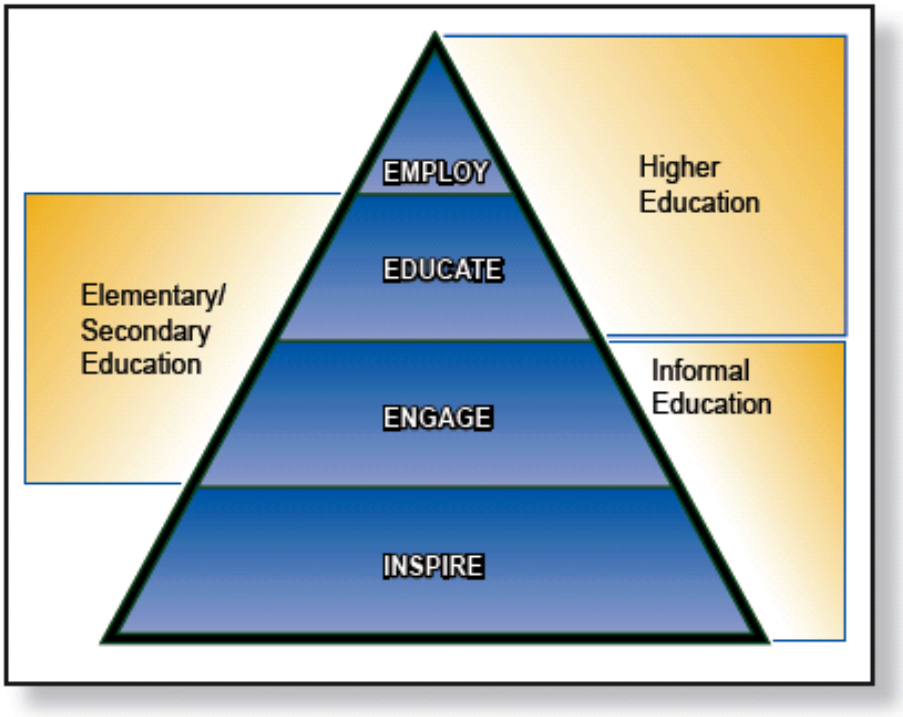
Office of Education, Elementary and Secondary Education Division

Project Plan: NASA Explorer Schools



Education Strategic Framework

Version Number: 1.0
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NASA Explorer Schools

Project Plan

1.0 PART I: PROJECT OVERVIEW

This document is the NASA Explorer Schools (NES) project plan for the Office of Education. It serves as a controlling document that defines the top-level strategy and the management structure. Intended to be a living document the NES Project Plan will be updated and reviewed annually. NES is a national project managed by NASA Glenn Research Center implemented at each of the 9 NASA Centers and Jet Propulsion Laboratory.

1.1 INTRODUCTION

Background

The NASA Explorer Schools (NES) Project establishes three-year partnership between NASA and school teams, consisting of teachers and education administrators from diverse communities across the country. Focusing on underserved populations, NES joins educators, students, and families in sustained involvement with NASA's research, discoveries, and missions. The project is designed for education communities at the 4-9 grade levels to help middle schools improve teaching and learning in science, technology, engineering, and math through significant structural techniques such as professional development, stipends, grants, the innovative use of technology and curricular supports based on NASA's resources.

NES provides a comprehensive middle-level project to students and teachers at the critical age of decision-making for NASA's education pipeline. It directly responds to agency **Outcome ED-2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.**

History

The NES Project was designed in response to a request from NASA leadership in mid-July 2002 to propose a K-12 mathematics and science initiative to equip the next generation of explorers. The initial design was based on the following assumptions established by NASA leadership:

- Encourage K-12 students to pursue careers in math, science and engineering
- Reach out to all students and reach younger students earlier
- Partner with others and extend collaborations
- Engage minority and underrepresented students
- Weave together opportunities and materials from across the Agency

A series of focus group meetings were held, from August through September, 2002 with Agency-wide representation, to gather information about available NASA resources and best practices. Later, external focus groups were called to discuss elements, and possible collaborative assistance. In addition, a thorough literature search was conducted to gather

educational research guidance and lessons learned from previous national efforts and Congressional committee reports. Key reports included *Science and Engineering Indicators 2002, Land of Plenty* from the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development; *The Condition of Education, 2002, Computer-Based Technology and Learning: Evolving Uses and Expectation*, North Central Regional Educational Laboratory.

Key Milestones of the program

2002		
	July	Task assignment from NASA leadership to develop a new K-12 Initiative
	Sept - Nov	Internal and external focus group sessions refine program elements
2003		
	February	Program announcement and opening of solicitation for first cohort of 50 teams
	July	Announcement of 2003 NES teams and National program kickoff at the National Educational Computing Conference
	September	Solicitation open for 2004 NES cohort of 50 teams
2004		
	October	NES grant solicitation for professional development, and technology tools.
2005		
	June	Awarding of eight grants for professional workshops and content development
	November	Strategic Implementation Framework development for NES
2006		
	June	NES Project Management Awarded to NASA GRC
2007		
	August	NES Transition from NASA HQ Completed

1.2 PROJECT DESCRIPTION and OBJECTIVES

The NES project is designed to provide urban and rural schools with unprecedented access to NASA resources, mission content, technology and opportunities.
The NES project leverages and customizes elements from the NASA Office of Education, Mission Directorates, and external partners to support school's improvement and educator professional development goals. NES provides customized professional development for educators that focuses on the use of the NASA context, resources, technology tools and opportunities in the classroom. Through action planning teams of teachers and administrators infuse the NASA context into their curriculum to provide relevance and real-world application of STEM content to students.

Schools form implementation teams that consist of four teachers and one administrator who serve as mentors and change-agents within a school. Team members work closely with NASA civil servant and contract staff to align NASA resources to school needs and ensure implementation of key project elements including: family involvement, use of technology tools, delivery of professional development, partnership and sustainability efforts, and delivery of NASA-themed content and opportunities to students. NES teachers are provided with a variety of resources and opportunities customized to address the individual school improvement and teacher professional development goals. Professional development opportunities encourage the use of hand's-on inquiry based learning models and other recognized education best practices.

Through participation in NES, underserved students from both rural and urban areas are exposed to science and mathematics activities they would not otherwise experience including: simulations, access to STEM professionals (astronauts, engineers, scientists, and technicians), science-related missions, highly interactive videoconferencing with experts from NASA Centers, and the opportunity to participate in student-led investigations (Reduced Gravity Opportunity).

OBJECTIVES:

FY08 Accountability Measures

Primary Accountability Measures

FY08 Annual Performance Goals (APG's)
Outcome 2.2 Performance Measures
Global Efficiency Measures

Secondary Accountability Measures

Outcome 2.1 Performance Measures
Outcome 2.3 Performance Measures
Outcome 2.4 Performance Measures

RELEVANT FY08 ANNUAL PERFORMANCE GOALS (APG'S)

APG 8ED04 Increase by 5 percent the number of elementary and secondary student participants in NASA instructional and enrichment activities.

APG 8ED05 Increase by 5 percent elementary and secondary educators' use of NASA resources in their classroom instruction.

Outcome II:
Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.
(Elementary and Secondary Education -- Educate & Engage)

2.1 Objective (Engage)

Provide short duration professional development and training opportunities to educators, equipping them with the skills and knowledge to attract and retain students in STEM disciplines.

Output Measures

2.1.1 Number of elementary and secondary educators participating in NASA-sponsored short-term professional development opportunities

Outcome Measures

2.1.2 Percentage of elementary and secondary educators using NASA content-based STEM resources in the classroom (PART Measure 7)

2.1.3 Percentage of elementary and secondary educators using NASA content-based STEM resources in the classroom who rate the resources as effective

2.2 Objective (Educate)

Provide long-duration and/or sustained professional development training opportunities to educators that result in deeper content understanding and/or competence and confidence in teaching STEM disciplines.

Output Measures

2.2.1 Number of elementary and secondary educators participating in NASA-sponsored professional development opportunities.

Outcome Measures

2.2.3 Number of teachers who use NASA content or resources as a result of another teacher's direct involvement with a NASA program.

2.2.5 Percentage of elementary and secondary educators who participate in NASA training programs who use NASA resources in their classroom instruction. (PART Measure 8)

2.2.6 Evidence that teachers who use NASA resources perceive themselves as more effective teachers in achieving STEM results with their students.

2.3 Objective: **(Educate)**

Provide curricular support resources that use NASA themes and content to a) enhance student skills and proficiency in STEM disciplines (Educate); b) Inform students about STEM career skills and proficiency in STEM career opportunities (Engage); c) Communicate information about NASA's mission activities (Engage).

2.3.4 Customer satisfaction data regarding relevance of NASA educational resources.

2.3.5 Customer satisfaction data regarding effectiveness of NASA educational resources

Relevant PART Measures

PART Measure 2 Percentage increase in number of elementary and secondary educators utilizing NASA content-based STEM materials and programs in the classroom.

2.4 Objectives: (Engage)

- Provide K-12 students with authentic first-hand opportunities to participate in NASA mission activities, thus inspiring interest in STEM disciplines and careers.
- Provide opportunities for family involvement in K-12 student learning in STEM areas.

Output Measures

2.4.1 Number of elementary and secondary student participants in NASA instructional and enrichment activities

2.4.2 Number of elementary and secondary student participants in NASA-sponsored extended learning opportunities

2.4.3 Number of opportunities for family involvement

2.4.4 Percentage increase in number of elementary and secondary student participants in NASA instructional and enrichment activities. (PART Measure 9)

Outcome Measures

2.4.5 Activities and investigations result in increased student interest in STEM

2.4.6 Activities and investigations result in increased student knowledge about careers in STEM

2.4.9 Level of student interest in science and technology careers resulting from elementary and secondary NASA education programs. (PART Measure 10)

Relevant PART Measures

PART Measure 1 Percentage increase in number of elementary and secondary student participants in NASA instructional and enrichment activities.

PART Measure 4 Level of student interest in science and technology careers resulting from elementary and secondary NASA education programs.

Efficiency Measures

Efficiency 1: Cost per participant of programs

Efficiency 2: Ratio of administrative cost to total cost of programs

Efficiency 3: Ratio of funds leveraged by NASA funding support

Relevant PART Measures

Efficiency Measure 1 Collect, analyze, and report the percentage of grantees that annually report on their accomplishments.

Efficiency Measure 2 Peer review and competitively award at least 85%, by budget, of research projects.

PART Measure 10 Number of people reached via e-education technologies per dollar invested.

PART Measure 12 Percentage of programs that have developed and annually measure their effectiveness using performance metrics relating to NASA's mission and education goals.

PART Measure 13 Percentage of grants awarded on a competitive basis.

PART Measure 14 Percentage of grantees that annually report on their accomplishments.

PART Measure 15 Dollar invested per number of people reached via e-education technologies.

1.3 MISSION DESCRIPTION

NES Project Goals

Goal I. Provide all students the opportunity to explore science, technology, engineering and mathematics (STEM)

Objectives:

- Increase student **interest and participation** in STEM.
- Increase student **knowledge about careers** in STEM
- Increase student **ability to apply** STEM concepts and skills in meaningful ways.

Several initiatives within the NES project support the active engagement of students in STEM content to increase their ability to apply STEM and to learn about career paths. Typically done with teacher support and training, these project elements offer direct uses of NASA mission data to solve investigative questions posed by students. Multiple efforts are underway to provide educators and students with content-specific activities, that use the NASA mission as a context to enhance a school's curricula by adding real world applications and relevance. Examples include:

- **Reduced Gravity Opportunity** provides access to unique NASA resources and cooperative learning with NASA scientists and engineers. Students work with NASA personnel during the development of student microgravity investigations, later flown on the Reduced Gravity Aircraft.
- During the school year students are provided with opportunities to talk to researchers in the field (or space) through **Ham radio**, **downlinks with the International Space Station**, and videoconferences.
- At the annual **NES Student Symposium** students present investigation results from NASA activities.
- In **Student Observation Network** (S.O.N.) students use web-based tools and online support to collect analyze and compare data with other students around the world.
- The **NASA NASA Digital Learning Network™ (DLN)** provides people, technology, facilities, programs, and resources to classrooms through videoconferencing. NES schools connect with NASA subject matter experts, NASA education specialists, and other NES schools to compare data, learn firsthand about NASA STEM research and careers, and receive professional development.

Goal II. Provide educators with sustained professional development, unique STEM-based teaching and collaborative tools, digital content resources and compelling NASA contextual-based teaching applications that align with national standards for targeted content areas.

Objectives:

- Increase the **active participation and professional growth** of educators in science.

- Increase the **academic assistance** for and **technology use** by educators in schools with high populations of underserved students.

The NES model requires collaboration between educators and administrators at the local level with NASA education specialists throughout the implementation of the project. Professional Development is provided in the summer and during the school year in collaboration with NASA Mission Directorate, professional education partners, and other NASA education efforts (including SEMAA and AESP). Professional Development is designed to:

- Learn how to use technology tools to support the delivery of classroom content including technology tools, web-based resources and videoconferencing capabilities through the DLN. NASA and a variety of other STEM stakeholders provides curriculum enhancement resources that can be delivered to educators through the use of technology.

- Strengthen and increase knowledge about problem-based learning and the inquiry process with NASA educational materials. Educational best practices such as problem based learning and the use of inquiry, encourage students to construct their own knowledge and develop a framework for learning that is essential to America's future STEM workforce. The NES project provides educators with professional development that showcases that use of best practice in the classroom when delivering STEM content.

- Learn real world and practical applications of science, technology, engineering, and mathematics, (STEM) and geography from NASA scientists, researchers, and engineers in NASA applied research facilities. The NES model works to connect students and educators with NASA subject matter experts to serve as a resource in the delivery of classroom content. Through a variety of special projects and opportunities NASA scientists and engineers serve as role-models and sometimes collaborators in the development of student investigations. NES provides educators with unprecedented access to NASA scientists and facilities. Teachers experience first hand at NASA research facilities how the classroom content that they teach is applied to the NASA mission of scientific discovery.

Professional Development is delivered in the following ways:

- During one-Week **summer workshops** educators experience NASA Mission Content first hand and receive training in agency-specific tools, technology, and resources that can enhance their curriculum. Summer workshops also focus on training in the implementation of NES project elements.
- **National and Regional Professional Development Conferences** expose educators to current best practices and resources and opportunities that will help them achieve school improvement and professional development goals outside of the NASA context. Opportunities also include NES project updates, and evaluation focus groups, organized around existing conferences. NES School team members are provided with travel support to attend a regional or national conference in mathematics, science, or technology. Through **NSTA Symposia and follow-up Webseminars** teachers are exposed to half-day or full day opportunities that immerse educators in current educational best practices and NASA mission content in conjunction with National and Regional Professional Development Conferences.
- **School In-services** NASA staff members provide customized training in content that will help schools achieve action plan elements and goals as well as model the teaching of high quality STEM resources in the classroom.
- **The NASA Digital Learning Network™** provides opportunities for educators to learn about NASA education products and services, integration methodologies, and related instruction technologies used to deliver NASA content.
- In the NES model teachers who have received professional development or successfully NASA products our resources in the classroom are encouraged to share the knowledge and success with fellow educators in their district and at National, Regional, State and local professional development conferences

Goal III. Build strong family involvement within NASA Explorer Schools Project.

Objective:

- Increase **family involvement** in children's learning.

Throughout the partnership, NES teams work with NASA personnel and other partners to develop and implement strategic plans for staff and students that promote and support the use of NASA content and activities to address the teams' local needs in mathematics, science, and technology education and invite family members to become involved in their children's education. With the support of the SEMAA and AES Projects schools support family activities designed to bring learning out of the classrooms and increase family interest in STEM education.

1.4 CUSTOMER and STAKEHOLDER DEFINITION and ADVOCACY

NES works to close the achievement gap among diverse and low socioeconomic populations. It is strategic in both geographic reach and focus -- serving over 200 school teams from diverse communities in all fifty states, the District of Columbia, Puerto Rico, and the Virgin Islands. NES represents both urban and rural communities where untapped talent awaits the right opportunity. Recruitment efforts target schools with a high percentage of underserved and underrepresented students including African-American, Hispanic, and Native American schools.

Key Participants:

Educators

- Teachers and Administrators from the selected schools, who are be provided professional development in STEM subject areas. Both NES Team Members (Up to 4 teachers and one administrator who serve as primary points of contact) and non-team members have access to NASA services and opportunities and utilize NASA materials in the classroom.

Students

- Students are involved primarily through their teachers and are provided with experiential opportunities to increase their STEM awareness.
- Students interact with NASA subject matter experts through the NASA Digital Learning Network™ AES project and special opportunity workshops.

Families and the Community

- Families and the community receive resources, information and opportunities to share in and support student learning through in-school and after school activities that showcase student and educator participation in NASA mission content and opportunities.

NASA Customers

- Aeronautics Research Mission Directorate (ARMD), Exploration Systems Mission Directorate (ESMD), Science Mission Directorate (SMD), and Space Operations Mission Directorate (SOMD), Office of Education, Center Education Offices
    - NES is designed to serve as a framework to allow underserved rural and urban schools to receive customized and focused NASA content and opportunities to meet their school improvement and professional development goals. NES is designed to provide schools with a comprehensive cross section of mission content and opportunity.

Federal and External Customers and Stakeholders

- NASA like many other federal agencies and external customers and stakeholders is committed to supporting the development of a future workforce.
- By supporting school improvement and professional development goals and providing students access to the NASA pipeline and information about careers the NES project has the intended outcome of encouraging students to enter STEM professions later in life.

1.5 PROJECT AUTHORITY

Agency-wide management and implementation of the NASA Explorer Schools (NES) project complies with the requirements, processes, and procedures of the NASA Education Strategic Coordination Framework.

Assistant Administrator for Education

- Responsible to the NASA Administrator for the NASA Education Portfolio, reporting directly to the Chief of Strategic Communications
- Serves as the head of the Office of Education and manages all responsibilities assigned to the Office
- Serves as the Chair of the Education Coordinating Committee (ECC), ensuring the overall planning, coordination, and integration of the Agency's entire education portfolio, including development of the education portion of the Agency Institutional Office Implementation Plan

Office of Education

- Administers national education efforts that draw on content from across the Agency
- Responsible for ensuring compliance with external requirements and laws, NASA-wide processes, procedures, standards, audits, and accounting related to Education (NPD 1000.0)
- Provides the leadership for coordinating and integrating NASA's education strategic framework, implementation approach, and policies
- Provides national partnership networks and infrastructure to disseminate NASA education content and activities developed by the Mission Directorates, Centers, and education partners
- Solicits external advice, and represents the Agency externally, especially in interactions with Congress, the Office of Management and Budget, and other Federal agencies
- Refers external inquiries to specific managers within its own office or any of the Mission Directorate or Center Education Offices as appropriate
- Provides integration and evaluation support to the ECC
- Maintains a centralized database of all NASA education activities and investments, and coordinates the evaluation and assessment of the Agency education portfolio

Center Education Offices

- Responsible for implementing NASA education programs, projects and activities for the Mission Directorates and the Office of Education
- Planning and implementing education programs that are unique to and funded by their Centers responsible for execution of programs and projects and for institutional assets
- Provide expertise in state standards and requirements in their area of geographic responsibility for K-12 education, and provide valuable field-based input into education program planning
- Work closely with their regional customer base in support of systemic reform initiatives in formal education, assist with the generation and communication of knowledge for their unique research and technology development requirements by involving colleges and universities across the country, and establish linkages with

informal education networks in support of Agency national STEM education initiatives
- Maintain cognizance of all NASA-funded education efforts that take place in their geographic region and/or programmatic areas of responsibility regardless of funding source
- Report administratively to their Center management and functionally to the Office of Education
- Receive programmatic direction from the Headquarters organizations that provide education funding to their Center
- Responsible for all Center education efforts

NASA Education Program/Project Managers
- Responsible for making and executing decisions within their authority
- Authority over the budgets, schedules, and human and capital assets for their programs or projects
- Responsible for working across organizational lines to perform appropriate integration functions

External Education Implementing Partners
- Implement education activities for the Agency
- Competitively selected and offer specific areas of expertise of use to the Agency
- Report to the Office of Education, Mission Directorates, or Center Education Offices according to the origin of their funding

Program/Project/Activity Evaluation
- Mission Directorates, Centers and the Office of Education regularly monitor and evaluate the programs, projects, products and activities they fund and report the results of those evaluations to their funding organizations and the Office of Education for review by the ECC.
- Education program, project, product, and activity evaluation are based on a common set of criteria including performance alignment with the Education Overarching Philosophy and Operating Principles, Outcomes, Objectives, and Measurable Outputs.
- Management of education programs/projects, complies with current NASA directives on program and project management, processes, and requirements.

1.6 MANAGEMENT STRUCTURE

The success of NES is dependent on a coherent system for planning and delivering all components. Based on school needs identified early in the project a multi-tiered personnel infrastructure has evolved to disseminate information, monitor and collect evaluation data, and identify areas of improvement for successful implementation of NES strategies. The current system of NASA Center, NASA Office of Education and external implementation partner support provides the day-to-day contact with NES schools and team members and the administration of the NASA Digital Learning Network™ (DLN). Civil servants will be responsible for oversight and verification of implementation efforts at each Center and provide the interface between policy and action.

The development and implementation of project elements are accomplished collaboratively between External Education Implementation Partners and NASA staff to leverage the skills, knowledge, and ideas of the many people who are involved.

The following personnel and functions are in place as the NES project concludes it's transition to management from a Glenn Research Center. Refinement to the functions may occur as a result of transition and careful study.

Division of Roles and Responsibilities of NES Project Management and Implementation

Agency NES Project Manager

- Allocate resources, funds, professional development opportunities
- Provide guidelines for overall project
- Monitor and evaluate overall project
- Provide overall project administration
- Serve as liaison between Agency Project Management at NASA Glenn Research, NASA Office of Education, and external education implementation partners

DLN Project Manager:

- Responsible for all aspects of the NASA Digital Learning Network™
- Serves as an interface between DLN Coordinators at all NASA Center and NES Project Management and NASAHQ.
- Responsible for aligning the content of the DLN catalog with the needs of schools.
- Responsible for the planning and oversight of all DLN operations.
- Responsible for management of DLN personnel and DLN-specific budgetary allocations

Center NES Project Managers

- Responsible for NES dollars at NASA centers (NES workshop, NASA Digital Learning Network™ (DLN), Special Projects)
- Facilitate NES and DLN operation and collaborate with AES and other Center Education efforts
- Assist NES in facilitating center relations
- Provide approvals on tech grants and action plans
- Monitor progress of school interactions
- Facilitate Center and NES Site signature of Memorandum of Understanding, and gain approval from Center Legal Office where necessary
- Assist in workshop development and provide final approval of workshop agendas
- Participate in NES monthly meetings
- Serve on NES National Committees
- Responsible for data verification and all NES Center reporting
- Manage application review process (select team, train in rubric etc.)
- Oversee of regional recruitment efforts
- Communicate NES project information to Center Education Directors
- Provide oversight of partnership efforts
- Oversee of NES kick-offs, and serve as liaison to Center Public Affairs Office and Office of Legal Affairs

Contracted Services

Agency NES Project Coordination Team

Project Coordinator

- Provides overall project coordination, day-to-day operation and implementation
- Responsibles for project communications
- Provides required Agency and Center project reports
- Serves as liaison to evaluation team
- Serves as liaison to other External Education Implementation Partners
- Maintains current project policies and procedures
- Monitors progress of ad hoc committees
- Monitors action plan development and implementation
- Distributes and track NES Memorandum of Understanding
- Develops & coordinates master project schedule
- Coordinates NES application and selection process
- Supports NESC training and maintain NESC resource guide
- Coordinates and Monitors NES Kick-off Events

Technology Services and Products Coordinator

- Coordinates technology grant review and provide final Agency approval
- Maintains NES website updates and changes
- Maintains eFolio updates and changes
- Monitors Student Observation Network updates and changes
- Serves as resource to NESC for technology issues and uses
- Leads core content initiative
- Coordinates NES compliance with Paperwork Reduction Act and Privacy Act
- Serves as liaison to NETS Team
- Serves as liaison to STS-118 education
- Provides oversight for new product review, approval and dissemination to NES

Workshop and Special Opportunities Coordinator

- Schedules, plans and facilitates special opportunities and workshops (Winter Story, Spaceward Bound, Reduced Gravity, Administrative, Grantee)
- Maintains and update workshop facilitation manual
- Provides guidance & content assistance for summer workshops
- Collects and compiles final reports, summaries of NEEIS data for all workshops
- Serves as liaison to travel contractors
- Tracks and compiles reports on NES teacher presenters at conferences
- Coordinates the development of standard presentations for common workshop elements (partnerships, family involvement, meatball use, eFolio tools and evaluation)
- Maintains workshop and special opportunities participant lists (two-way conversation with NSTA)

Partnership & Sustainability Coordinator

- Serves as liaison to external partners for development of partnership and marketing resources
- Develops sustainability workshop content

- Researches and identifies strategic partners (corps, non-profits, other government agencies)
- Develops long-range plan for NES school partnership
- Serves as liaison to Mission Directorate Education Leads
- Serves as liaison to Delta Researcher Schools
- Assists NES Sites with grant development
- Serves as POC for external proposals
- Monitor Alumni NES sustainability efforts and Mentor project

DLN Asst. Manager:

- Plans, prepares, and conducts bi-monthly DLN meetings
- On behalf of all sites, submits data for monthly, quarterly, and yearly reports
- Supervises content creation, review, revision, and approval
- Represents DLN at conferences/presentations
- Works with Project Manager on policy development and implementation
- Attends all NES management meetings to represent DLN services and obligations

Project Operations

- Administers and disperses grant funds and stipends
- Maintains data entry, storage and retrieval of NES database, including participant, school, and applicant records
- Provides NES teams opportunities to participate in professional development conferences
- Provides promotional materials
- Supports recruitment efforts at professional conferences

Center NES Support

Center NES Coordinators

No non-NES related activities are recommended. Significant NES project dollars are supporting this effort. While there are times that all Center staff are needed to support Center activities, it would not be in the interest of the NES project if the coordinators were given non-NES related tasks that require major time commitments.

- Coordinate NES activities within each assigned NASA Center region
- Serve as liaisons between NES schools, NES Leadership Team, Center NES Project Manager, and NSTA
- Serve as designated POC's to NES Sites day-to-day communication and project information
- Maintain calendars of school events

- Monitor e-Folio and evaluation progress
- Facilitates action plan review
- Provides initial approval of technology plans
- Tracks required documents
- Monitors evaluation data collection in NEEIS
- Works with Center DLN Coordinator to ensure schools technology requirements are met
- Limited travel to NES sites, conferences and professional development conferences
- Conducts monthly telecon with schools
- Responds to project inquiries
- Works with other resources to identify opportunities that meet school needs
- Coordinates and facilitate kick-offs events
- Plans and facilitates workshops, collect participant feedback in NEEIS and complete final workshop report
- Announces new opportunities to schools
- Serves on ad hoc committees
- Maintains 90-day report and Weekly Activity Report (WAR) entries
- Logistical support for recruitment
- Provides support for applicant schools
- Handles logistics of application review and serve as reviewer
- Coordinates and facilitates pre-visits to newly selected NES sites
- Coordinates local and regional partnership efforts

DLN Coordinators:

- Sets up, operates, and maintains hardware/software infrastructure at DLN site
- Uses DLN Scheduling System, schedules and delivers requested events
- Works with other DLN sites to develop, test, and deliver new and existing content
- Serves on one of the standing committees (Content, Operations, Communications, Scheduling)
- Works with NES Coordinators on technical issues, content development, and communications with NES
- Represents the DLN at Center education office meeting as requested by supervisors
- Attends conferences/workshops as specified by DLN management

Administrative Support:

- Facilitate NEEIS collections, validate entries and track completion
- Check database for stipend requirements
- Track Documents
- Trouble shooting and password reset of applications and website
- Team member replacement forms
- Application review preparation

National NES Project Steering Committees

NES will task project steering committees and working groups to develop project components and activities. Committee membership will include NES Coordinators, NES Project Managers, Aerospace Education Specialists, and NASA Digital Learning Network(tm) Coordinators. On-going project ad hoc committees:

Alumni Support
Task: Identify and ensure services and support provided to alumni sites

Evaluation Support
Task: Review/revise current action plan tool and assist evaluation team review evaluation tools for appropriateness

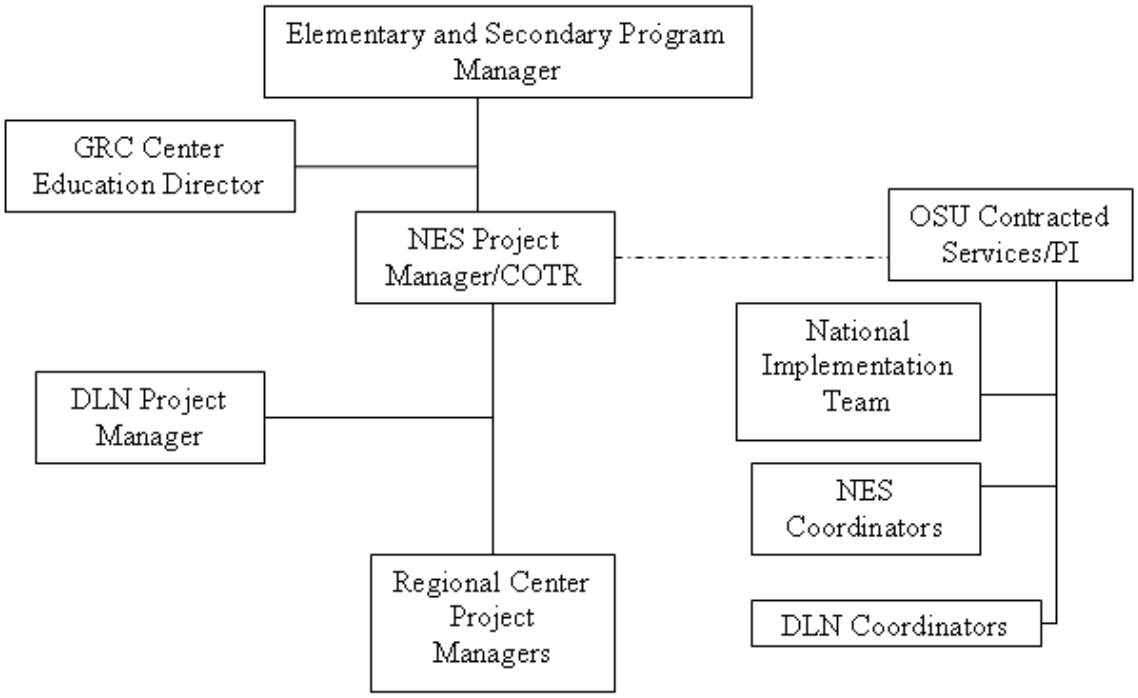
Family Involvement
Task: Develop and disseminate family involvement resources to NES. Resources include the Family Involvement Handbook, Take-home Backpack Project, and Lunar Challenge.

Mentor Schools
Task: Develop and implement mentor schools project, that pair a successful NES with a first year site

Multicultural Involvement
Task: Ensure that current recruitment, selection, and services of NES reach and meet the diverse communities served by NES.

Robotics
Task: Maintain understanding of current educational robotics resources and provide professional development to NES personnel as needed.

1.7 GOVERNANCE STRUCTURE



Communication Pathways
The NES Project Manager responds to NASA Elementary and Secondary goals and outcomes through the NASA HQ Elementary and Secondary Program Manager and works collaboratively with the Regional Center Project Managers in determining project directions and adjustments. All grants and contracts are managed by the NES Project Manager.

The implementation at the Centers is directed by the pre-college officers who have oversight of the Center coordinators (NES and DLN). The NES National Implementation Team coordinates day to day operations and implementation with the NES Project Manager, PI and Center NES Coordinators.

The DLN is managed as an Agency asset through the NES project. It is managed from Langley Research Center in cooperation with the other nine Centers. The DLN Project Manager works with Center Project Managers and DLN coordinators to implement the effort.

The infusion of educational opportunities into the NES project from Educator Astronaut, Flight Projects, SEMAA, and the AESP project are key to a cohesive K-12 NASA Pipeline. At the present time, interactions are present with all projects, but to a larger extent with the AES project, as the education specialists are a key component to on-site school support and in-service opportunities. The SEMAA project has cooperated to provide family handbooks and in-services to increase the involvement of family members in the NES project.

1.8 PROJECT REQUIREMENTS

The NES project through the Center project manager adheres to the following reporting requirements:

- Annual performance planning and reporting as required with annual performance goals identified, measured, and monitored throughout the fiscal year.
- Monthly reports are submitted and quarterly reviews are held.
- Annual review with results of the review used to develop an improvement plan to be integrated within its next annual performance plan.
- Submission of online Weekly Activity Report.
- Continuous input to the Education database, NEEIS, for capturing annual data and metrics to support Agency reporting.

1.9 TECHNICAL SUMMARY

The NES Project works with urban and rural schools to deliver professional development, provide access to technology tools and increase family and community involvement in STEM education to assist them in meeting school-improvement and teacher professional-development goals. NES encourages and inspires students to pursue STEM careers by providing teachers tools that allow them to bring relevance to their curricula by infusing NASA content into their lessons.

1.10 IMPLEMENTATION APPROACH

The NES Model

Orientation Phase Goals

The orientation phase begins when the school team receives its acceptance package. The team members work together to develop a process to respond to the acceptance package requirements. Field center staff visits the school and gives the team the NES Handbook. The NES team completes a student needs assessment and a technology infrastructure assessment and identifies preexisting STEM-G support activities. The team then takes the results of this research to the five-day summer orientation workshop, where team members learn about NASA resources and develop their implementation plan. Throughout this phase the NES team is defining its roles, learning to work together, and understanding NASA's role in the partnership.

Year 1 Start-up Phase Goals

The focus of the first year is the development of the NES team's knowledge and use of NASA resources. The Aerospace Education Specialists are instrumental in suggesting curriculum-specific resources, helping with kickoff and family events, and providing on-site professional development. The NES team gets its videoconferencing equipment up and running, communicates with their NES coordinator regularly, develops working relationships among team members, and works on family and community involvement. Other teachers are invited to attend events, a NASA resource library may be set up. The student needs assessment is finalized. The NES team establishes a regular meeting schedule and identifies ad hoc team members. A Family Involvement program is begun. By the end of the year, the team takes stock of who was involved and plans to send some staff members to content workshops that will further meet the needs of students by using NASA content. Potential local and regional partners for addressing the implementation

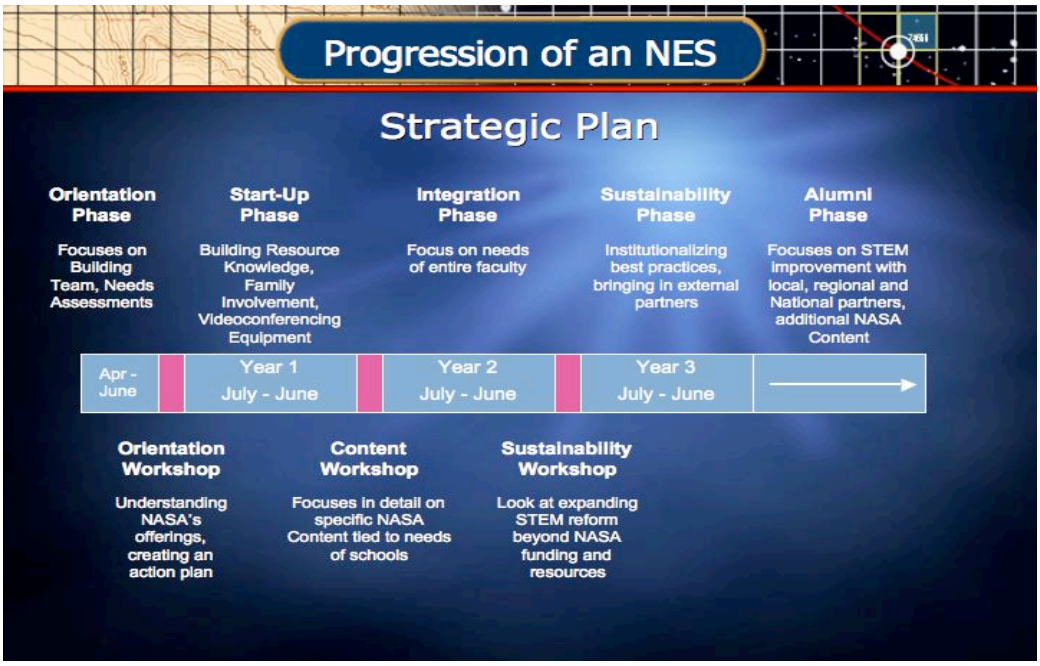
plan should be identified. All events relating to the NES Project are documented in the school's e-Folio.

Year 2 Integration Phase Goals

During the second full year of the partnership, the focus is on the entire faculty meeting identified student needs in STEMG with NASA resources. Some staff members will have attended content workshops and can share what they learned and how it will be integrated into the curriculum. The NES team is more familiar with NASA resources and can make specific suggestions to other teachers for what can be integrated into the curriculum. The AES will offer professional development for more teachers to use NASA resources and inquiry activities with students. Local and regional partnerships should be cultivated and developed to provide additional people and resources for addressing the implementation plan. The Family Involvement program is expanded. All events relating to the NES Project are documented in the school's e-Folio.

Year 3 and Beyond Sustainability Phase Goals

During the third year of the partnership, the focus is on institutionalizing the best practices of the school (including the Family Involvement program) and other NES schools and planning for sustainability, including establishing external partnerships for funding and other resources, continuing use of NASA resources and technology (particularly DLN support), planning professional development, and achieving whole-school implementation. This phase begins in the summer with a sustainability conference, during which the NES team networks with other teams and State Coalition partners and learns about resources to sustain its NASA programs after year three. All events relating to the NES Project are documented in the school's e-Folio.



NES Team Approach

Teachers working together in teams can be a powerful influence on the curriculum and school improvement. Effective teams:

- Need the opportunity to collaborate and reflect regularly;
- Share and discuss data, decision-making, and take on leadership roles
- Facilitate a culture of learning regularly engaging in a variety of formal and informal learning activities;
- Build strong relationships of trust and support, and develop core values and beliefs that lead to successful student and adult learning.

A NES team consists of four full time educators and an administrator. This team will lead the local effort, participate in the NASA summer workshop and the ongoing professional development during the academic year. All team members must be U.S. citizens.

Teams must select a **team leader** who will be the point of contact between the school, NASA and NSTA. The team leader is responsible for ensuring that all required documentation and forms are submitted to NASA and NSTA prior to deadlines, attending to requests for information, and disseminating information to the team.

Team administrators should be persons who have authority to allocate granted funds for the purchase of items needed for the project and authorize professional leave for team members to attend meetings and NASA activities as needed. Team administrators also assist in setting clear goals and setting a release timeline for teachers to attend professional development.

Teams should select a person to serve as the **family involvement coordinator** for their school. This person does not have to be a member of the NES team. The NES team may select a parent resource person, parent organization leader (i.e. PTA leader), or teacher/staff member. The family involvement coordinator works with the NES team to increase family involvement in student learning. This individual may also work with the NES team to establish NES project sustainability partnerships within the community.

Teams may find it beneficial to assign roles and responsibilities to each team member. All **team members** are responsible for working as a team, taking responsibility for tasks/leadership, attending team meetings, and completing all requested evaluation forms. Suggested roles and responsibilities for the team lead, administrator, team members, and staff are located in the NES site reference binder.

NES teams should meet on a regular basis to plan and assess program activities and events. Team meetings should be listed on the eFolio and documentation such as agendas and/or minutes from team meetings may be uploaded.

NES Memorandum of Understanding (MOU)

The Memorandum of Understanding (MOU) is the official legal agreement between NASA and the school district. The MOU outlines the responsibilities of the school

district and NASA during the three-year partnership. Three copies of the MOU must be signed by NASA and and NES Site officials. One signed copy of the MOU will be filed in the official NES project files at NASA Glenn Research Center, the assigned Field Center, and the NES Site.

NES Action Plan - Electronic Portfolio (eFolio)

The e-Folio is the primary means of communicating accomplishments as a NASA Explorer School. The e-Folio contains the School Profile, Executive Summary, Needs Assessment, and list of implementation activities. The eFolio can be accessed by logging in to the e-Folio website at http://aesp.nasa.okstate.edu/efolio

School Profile: The school profile provides a place for NES Sites to tell their story. Here NES Sites will describe their schools, and provide information about demographics, geographic setting, and supply school contact information and URL. NES Sites may uploaded digital images on their profile to help others know your their school.

Executive Summary: The executive summary is a one-to-two paragraph narrative overview of the NES team's plan for implementing the NES project in their school (the big picture). NES teams should include how the project will impact the needs at the local level in science, mathematics, and technology. Correlation to the school(s) improvement plan is important.

Needs Assessment: The school needs assessment is a prioritized list of ten national standards the NES team desires assistance in meeting through the NASA Explorer Schools project partnership. Updated annually, the needs assessment guides the planning process for NES activities, including AES visits, professional development, DLN events, and purchases with technology grant money.

Strategic Plan Checklist: Evaluation of the three-year pilot (2003, 2004, 2005) of the NASA Explorer Schools (NES) program yielded models of successful practice. These school models of success have been developed into strategies associated with the orientation process and annual phases of the three-year NASA-school partnership.

This strategic plan checklist gives NES teams a tools to assist their strategic planning process for each of the phases. A list of the strategies for success helps teams plan actions and discussion topics for team activities. A graphical organizer provides a "big picture" of key events to occur in each of the phases.

NES team roles, school-wide involvement, administrator support, and community involvement are encouraged throughout the strategic planning process. Remember that NASA personnel are involved in supporting NES teams throughout the strategic planning process. Key NASA personnel include: the NES coordinators, aerospace education specialists (AES), NASA Digital Learning Network(tm) (DLN) coordinators, and NASA field center education project managers.

Implementation Plan - Activities List: The primary components of the eFolio are the activities the NES team plans to accomplish during the year to address school STEM-G improvement goals. Each activity will align with one or more of the NES project objectives and school needs assessment. After completion of each activity, the NES team will update the eFolio entry, complete a short evaluation and have a chance to upload digital artifacts from the activity. For each NES project objective teams should have one or more activities as appropriate for the schools needs.

Technology Plan (Budget): NES provides Technology grants to support the purchase of equipment and technology necessary to implement the approved action plan. The NES team must submit a technology budget plan and accountability forms to obtain grant money. Support for the grant is contingent upon the availability of funds, progress of the project, and demonstration of relevance to the NES project objectives. Funding will be issued according to the following schedule:

- Year 1 maximum funding - $10,000
- Year 2 maximum funding - $5,000
- Year 3 maximum funding - $2,500

Each NES teams will submit a budget for how the technology grant funds will be spent. The budget is submitted on-line through the NES website (http://explorerschools.nasa.gov).

All teams need ready access to videoconferencing equipment. Monies from year 1 may be needed to support purchase of equipment.

The NES technology grant is awarded to teams to support the NES project through the purchase of:

- technology tools (for example, computers, PDAs, LCD projectors, LEGO robotics)
- technology support items (computer software, cables, DVDs, probeware, technology training, limited amounts of printer paper)
- technology services (ISDN lines, T-1 drops, internet provider fees, cable TV fees)
- math manipulatives (compasses, protractors, rulers, Cuisinaire strips)
- science equipment (meter sticks, beakers, thermometers, colored pencils)

Technology grant funds cannot be spent on items including, but not limited to:

- salary (teacher, substitute teacher, stipend, honorarium)
- general building update/maintenance (paint, carpeting, vacuum cleaner)
- field trips (bus rental, admission charges)
- purchase school assembly programs
- food/beverages
- clothing
- buses or any other vehicle

The ENTIRE TEAM must agree on any/all purchases, as the team is the steering committee for all aspects of the NES project at the school(s) represented by the team.

All items that a team wishes to purchase must be listed and individually named on the technology budget plan. Once NASA approves the technology budget plan, any additional items must be submitted to the NES coordinator and MUST BE APPROVED prior to purchasing an item. Only approved items, listed on your approved technology plan, can be purchased. At the end of the year, all grant money must be accounted for and technology plans reconciled to reflect exact expenses. Any items purchased that were not approved prior to purchasing will not be considered as authorized expenditures. The cost for purchasing unauthorized items will be borne by the school or individual purchasing the item.

Small amounts of money may be carried over from year to year, but at the end of the three year agreement, any money not spent appropriately (or at all) must be returned to NSTA.

At the end of each year, the amount that is reported as spent (on the U.S. Office of Management and Budget Form 269) MUST agree with the reconciled technology plan.

Receipts, purchase orders, and the like do not need to be submitted. However, the person(s) who sign the W-9 (school), the OMB Form 269, and the Form 424 are legally responsible to the United States government for the NES grant funds and items purchased.

Partnership and Sustainability Plan: NES teams will create a sustainability plan that identifies resources that will provide support for the NES project beyond the three-year NES partnership. The partnership and sustainability plan will:

- Define annual project commitments according to major core service areas
- Assess needs relative to project commitments
- Identify resource gaps
- Design targeted partnership strategies to eliminate resource gaps

1.11 PROGRAM/PROJECT DEPENDENCIES

The successful implementation of the NASA Explorer Schools is dependent on the implementation by the NASA field centers and its contractors and grantees. The NES Project delivers the content of the mission directorates to partner schools. It is essential to the project that linkages are made to content that aligns with the NASA mission. NES provides a framework for deliver of NASA Content to schools, but the project is dependent upon continued NES access to NASA Educational opportunities. NES partners with several other NASA projects for deliver of critical services including the Reduced Gravity Flight Opportunity, Spaceword Bound, Flight Projects, NETS, CORE, etc. The Aerospace Education Services Project provides education specialists who work directly with each NES school and is the most important mechanism for NES team members to receive onside professional development training, assistance with special events such as family nights, special training with technology

tools such as telescopes and robotics, and collaboration with projects that require extensive preparation as in the Reduced Gravity Project. Specialists have a wide range of knowledge of NASA materials and projects and provide information to the NES teams as they implement their strategic plans. The NES program does not have the funding to provide these services and the impact of the program would be drastically reduced without the AESP Specialists.

1.12 LOGISTICS

See Grants and Services

2.0 PART II: PROJECT BASELINE

2.1 SCHEDULES

January
- NES application closes on January 31
- Mid-year team member replacement window is open January 1-15
- All fall team member stipend requirements must be completed; stipends will be distributed
- Winter Story special opportunity workshop

February
- NES Center selection teams convene to review and prioritize NES applicants in their region
- Reduced Gravity Flight Opportunity
- Applications accepted for Summer Content Workshops
- Mid-year NES Site status reports due February 28

March
- National selection board convenes to finalize NES selection; NASA Senior Management concurrence
- Summer workshop planning and logistics begins
- Center unique MOU requests due

April
- New NES Site notification
- Distribution of acceptance packages
- Regional Virtual Student Symposia

May
- Leadership training for newly selected NES team leads
- National Student Symposium
- National Partnership Recognition event
- End of the school year team member replacement window open May 15-31
- Spring stipend requirements due

June
- Spring stipend distribution
- Orientation and Content Workshops

July
- Orientation and Content Workshops
- Sustainability Conference
- End of the school year NES Site status reports due July 31

August
- Special Opportunity workshops for following school year due

September
- Beginning of the school year NES team member replacement window open Sept. 1 - 15
- NES Site signature page must be completed and returned to Field Centers by Sept. 15
- Summer workshop reports due from NES Coordinators on Sept. 30
- NESC and AES will provide support to Explorer Schools Teams as they develop their NES Action Plans and Technology Plans for the 2007-2008 academic year

October
- Kick-off events at 2007 NES (continue through end of November or early December if neccesary)
- Fall Action Plan, Technology Plan and Forms, Evaluations (pre-assessments), and Family Coordinator Form must be completed by NES Teams by October 31

November
- NESC review of eFolio action plans and technology budgets
- Beginning of the school year NES Site status reports due November 30

December
- Technology Grant Disbursal to NES

Grants and Services-
NES is primarily administered through the following agreements:

Grantee/Cooperative Agreements: NRESS
Purpose: Support travel and onsite activities for NES Student Symposium and NES Summer workshop travel for teachers
Performance Period: FY2008

Grantee/Cooperative Agreements: National Science Teachers Association
Purpose: Provide conference management, distribution of technology grants and stipend checks, management of application process, management of workshop application process and logistical support.
Performance Period: 10/1/2007-7/31/2008

Grantee/Cooperative Agreements: Oklahoma State University
Purpose: Provide project implementation support, professional development and publications support via NES and DLN Coordinators and other personnel
Performance Period: 6/30/2007-7/31/2008

2.2 RESOURCES

The project projects 12.2M in FY 2008 to support operations. The NASA Explorer Schools (NES) project will continue to serve schools nationwide and select at least 35 new schools in FY 2008. High-quality professional development opportunities that use mission content to address the needs of partner schools will continue to be the primary focus of NES efforts. This professional development will be delivered through workshops hosted at NASA Centers, in schools, at national conferences or workshops hosted by partners, and through technology tools such as videoconferencing and web seminars.

While partnered with NASA, NES teams acquire new teaching resources and technology tools using NASA's unique content, experts and other resources to provide students with exciting learning experiences in science, mathematics and technology. The project will continue to establish linkages that promote sustainable reform efforts after the 3-year partnership is completed. NES will continue to develop common procedures and tools to ensure that workshops and activities meet the goals of the project and provide consistent content delivery across Centers. Center implementation teams consisting of Regional Center NES Project Managers, NES Coordinators, DLN Coordinators, and Aerospace Education Specialists will use the NES strategic implementation checklist and school action plans to identify and deliver specialized teacher training, and student and family-involvement opportunities that address the needs of diverse school populations. NES has developed a national partnership and sustainability plan to assist partner schools in using NASA as leverage to strengthen and broaden their STEM reform efforts. Project Management will work with Alumni schools to serve as mentors to active NES schools and centers of STEM Education in their districts.

Evaluation services will report findings on the impact of NES on students and teachers as well as providing data for relevant agency and OMB reporting. NES will increase the rigor of its evaluation by expanding Randomized Control Group Testing within its partner schools.

NES will work with partners through contracts and cooperative agreements to provide personnel, evaluation services, logistical support for professional development and conferences, fiscal responsibility for stipends and technology grants, marketing and promotions, and implementation of partnership and sustainability plans.

<u>Budget Impact from FY 2007 Reductions:</u>

In FY 2007 the NASA Explorer Schools Project absorbed a 4.5 million dollars in budget reductions. This reduction required rescoping of project elements and limited NES ability to achieve agency goals in the following ways:

- Unable to support active NES Schools in all 50 states
- Selected 25 new schools instead of projected 50
- Cancelled solicitation for new professional development opportunities
- Cancelled 5 summer content workshops
- Cancelled special opportunity professional development workshops dealing with remote sensing and oceans
- Cancelled support of NASSMC partnership and sustainability grants
- Cancelled the Student Symposium allowing NES to reach fewer students
- Reduced the scope of the Sustainability Workshop allowing NES to train fewer teachers
- Cancelled promotional video production work
- Reduced support for ad hoc committees that allow us to better understand the needs of populations served by NES
- Reduced support of DLN at field Centers limiting scientist support and new equipment
- Reduced travel for special opportunity workshops limiting the number of teachers involved

2.3 ACQUISITION MANAGEMENT

To comply with competitive sourcing requirements the NES project will conduct a fair and open competition major components of the project including: staffing, logistical support, distribution of technology grants and stipend checks, and managmenet of applications processes. This procurement will occur during this FY 2008.

2.4 PERFORMANCE

Evaluation Tools

Multiple data sources are used in the NES evaluation. Surveys are kept to a minimum to reduce the burden on participants.

NES team members and school wide faculties complete surveys before and after the school year. These surveys provide formative data for planning at the beginning of the year, and summative data on pre/post changes based on matched pairs analysis in attitudes, skills, involvement and interest.

The school team leads and NASA field center staff complete surveys in the spring to evaluate the nature and extent of involvement of each group and their interaction.

All schools plan and report on all their activities in an eFolio for formative evaluation of their engagement, feedback to NASA staff, and participation in the NES network. Schools are able to view each other's eFolios to learn from each other, and network within the group. eFolio questionnaires are completed for each activity to provide summative data on the nature, extend and effectiveness. The eFolio also provides summative data on the duration, participants, needs met and NASA resources used by performance objective.

Student outcome data is collected from a stratified random sample of schools (by cohort year and center) through content tests and student interest surveys. The content tests were created, piloted and revised in 2005-2006. During 2006-2007 they will be used when the concepts are taught in the curriculum as pre/post measures with control randomized group trials for the NASA intervention, the non-NASA intervention and no lesson. The student interest surveys were developed in 2004, revised in 2005 and revised again in September 2006 to be given at the beginning and end of the year. They provide formative data on students' level of interest in STEM-G content and careers, and their attitudes and knowledge of STEM-G. Matched pairs analysis provides summative data on change due to the NES partnership. The table below summarizes the samples by survey.

Professional development is evaluated using surveys of all participants involved and an analysis by facilitators. In Orientation (before 1st year) and Content workshops (before 2nd year), daily evaluations are used for formative data on the use of best practices and the effects on participants, and an end of the workshop evaluation of effects and needs. Planned activities are entered into the e-Folio during or immediately following the workshop. In the Sustainability workshop (before teams' 3rd year), an end of workshop survey is completed. Sustainability activities are also identified in the e-Folio and reported on there. Special professional development opportunities during the year have end of workshop evaluations. Some have content/skill pre/post or products. All special professional development opportunities should result in applications to the classroom and be entered as e-Folio activities.

NASA Education Evaluation Information System (NEEIS) Evaluation Tools

- **Workshop Evaluation Tools**
  - Daily Workshop Evaluation Form
  - Teacher Final Workshop Final Feedback Form
  - Administrator End of Workshop Evaluation Form
- **Project Evaluation Tools**
  - Teacher Involvement Survey
  - Administrator Assessment
  - Teacher Assessment: Teaching, Learning, and Computing (TLC)
  - Student Interest Assessment (Grades 4-6)
  - Student Interest Assessment (Grades 7-9)

3.0 PART III: SUBPLANS

3.1 COMMUNICATIONS PLAN-

The portfolio approach to the management of NASA's education efforts provides a holistic view of all NASA education programs, projects, products, and activities. It also facilitates performance evaluation, assessment, and accountability reporting, as well as communication of program status within NASA and to external stakeholders.

The report requirements provide a uniform system of documentation and assures clear and consistent communications throughout the program community on project progress, status, and

issues. The integrated operation of these functions furnishes the means to determine the harmony of actual and planned cost, schedule, and performance goals during development and implementation by verifying whether everything is occurring in accord with baseline plans.

Communication between HQ and Centers is key to the success of this plan. Project managers will keep in touch via email and a monthly videoconference or telecon for guidance from and progress of other project activities.

Weekly telecons are held with the NES Coordinator team, other external partners and the evaluation team to discuss project implementation statuses and up-coming key events.

3.2 CONTROL PLAN

The Elementary and Secondary Program control and compliance process includes reporting and reviewing performance against baselines (as detailed in this document); evaluating alternatives; developing disciplined processes for considering, approving and implementing changes to official baselines; and assuring positive feedback on all directions and decisions. The program also provides a uniform system of documentation and assures clear and consistent communications throughout the program community on project progress, status, and issues. The integrated operation of these functions furnishes the means to determine the harmony of actual and planned cost, schedule, and performance goals during development and implementation by verifying whether everything is occurring in accord with baseline plans.

The Project Manager must request, in writing, deviations from the project plan or from the POP project-specific guidance including center-to-center or inter-center transfer of funds. The program manager reports major changes as reported to Education Technology and Products Executive.

Ultimate responsibility for the effectiveness of management control rests with the Project Manager. Delegation of authority, definitions of roles and assignments of responsibilities carry with them the terms of accountability.

Project funding shall be evaluated mid-year (prior to start of third quarter of the fiscal year) relative to the demonstrated performance of the project team and to the educational value of the project's activities. Projects not meeting their deliverables, schedule or other commitments, or having insufficient alignment with NASA outcomes and objectives, may have their funding reduced or eliminated.

This portfolio management approach will provide information necessary for reallocation of resources; sunsets to projects, if necessary; and ensure a coordinated, non-duplicative set of Elementary and Secondary Program projects that work together to achieve NASA Education outcomes. The Elementary and Secondary Education Program control and compliance process includes reporting and reviewing performance against baselines (as detailed in this document); evaluating alternatives; developing disciplined processes for considering, approving and implementing changes to official baselines; and assuring positive feedback on all directions and decisions. The program also provides a uniform system of documentation and assures clear and

consistent communications throughout the program community on project progress, status, and issues. The integrated operation of these functions furnishes the means to determine the harmony of actual and planned cost, schedule, and performance goals during development and implementation by verifying whether everything is occurring in accord with baseline plans. The program manager reports major changes with all project plans to Office of Education Assistant Administrator and Education Coordinating Committee.

3.3 RISK MANAGEMENT PLAN

Continuous risk management will be conducted through regular reviews and updates to the project, project and subproject plans. A robust performance and budget data integration process will be applied across the projects that are consistent with project requirements. This process will be designed to provide OE management with timely data to anticipate potential areas where project performance goals and milestones may not be met with the current funding or schedule. This risk management process will provide management with timely data in order to institute project/project schedule, cost, and/or content corrections.

NASA Explorer Schools is a relatively low risk project. The primary risk is a loss of affiliation with principal participants resulting in the loss of opportunity to reach the targeted audience. Loss of affiliation is most often attributed to a lack of informational material currency, to funding disruption or stoppage, or to issues related to technology deployment.

NASA Education will monitor and mitigate project risk through continual evaluation of project content and delivery method, adjusting the content and deployed technology to assure currency. Also, the Elementary and Secondary Project Manager will carefully monitor funding levels and flow to ensure continual engagement with current and intended funding recipients.

3.4 TECHNOLOGY STRATEGY OR INSERTION

The **NASA Explorer Schools Website** is the backbone for the development of online learning communities connecting all NES audiences. NES documents, calendars, and informational items are posted on the NES website**.** Discussion boards and private portals allow for communication of NASA and NES members. The website has sections for students, families, and partners in addition to the educator/administrator and NASA personnel. http://explorerschools.nasa.gov

An integral part of the NES is availability of the NASA NASA Digital Learning Network(tm) (DLN) that provides NASA people, technology, facilities, projects, and resources to deliver learning opportunities via videoconferences to teachers and students. The DLN has been primarily funded through the NASA Explorer Schools Project and is managed at each NASA Center. Project management of the organization has been active at Langley for two years through the DLN project manager.

3.5 COOPERATION AND COMMERCIALIZATION

The NES project collaborates with a number of external partners including colleges and universities, non-profits, and for profit companies. NES adheres to all Space Act Agreement, Partnership Development, and Technology Transfer guidelines and circulars.

3.6 SAFETY AND MISSION SUCCESS PLAN

Safety is the first consideration before any other Agency or organizational goal or objective. Health and Safety are also important in the delivery of the NES project.

All NES staff adhere to standards of mission safety that are promulgated for all employees of the National Aeronautics and Space Administration and its Field Centers. In addition, any student or teacher activities will adhere to all NASA regulations and NPD's concerning both hardware and software aspects of the educational projects.

NES in-services for staff and NES participants include safety training in order to ensure that strategies and activities are translated safely to the classroom.

3.7 ENVIRONMENTAL MANAGEMENT PLAN

The Elementary and Secondary program manager and project team members adhere to environmental compliance requirements, which are promulgated for all employees of the National Aeronautics and Space Administration and its Field Centers.

3.8 SYSTEMS ENGINEERING PLAN

Not Applicable

3.9 VERIFICATION AND VALIDATION

Managing each of the three Outcomes within the Agency education portfolio requires a cross-cutting review that encompasses all projects, products, and activities, whether originating in the Office of Education, the Mission Directorates, or the Centers. The Office of Education will assign a staff member for each Outcome to conduct strategic analysis and planning, establish measurable metrics, and implement an evaluation plan. The staff member for each Education Outcome will report on the Agency's progress toward achieving that Outcome to the AA for Education and the ECC.

Outcome reviews will employ a variety of mechanisms to assure that activities associated with each Education Outcome align with the education operating principles, yield demonstrable results, and reach intended audiences. Use of external reviewers will be an integral part of outcome reviews to provide NASA with credible information regarding how well its education efforts meet customer needs. Outcome reviews include the results, findings, or conclusions of individual project, product, and activity evaluations from within the portfolio.

3.10 REVIEWS

The success of NASA's education portfolio depends upon strategic planning across the Agency. Close coordination through high-performing teams is required among NASA's Office of Education, Mission Directorates, Centers, the Office of Human Capital Management, the Office of Diversity and Equal Opportunity, and other Mission Support offices

Close and effective consultation, coordination, and cognizance among all entities – Education Divisions, Mission Directorates, and Centers – as aligned towards Outcome 2 or which pull or push audiences from

the NES project are critical to the optimal fulfillment of NES objectives relative to overall education investment.

Center Education Offices are responsible for implementing the NASA Elementary and Secondary program through a portfolio of funded projects. The Elementary and Secondary Program-funded Centers and external partners are responsible for execution of projects and for securing needed institutional assets including logistics and supply.

The E&S Program management approach will provide information necessary for realization of efficiencies, cost savings and reallocation of resources; sunsets to projects, if necessary; and ensure a coordinated, non-duplicative set of Elementary and Secondary projects, products and activities that work together to achieve NASA's education outcomes.

Use of external reviewers will be an integral part of outcome reviews to provide NASA with credible information regarding how well its education efforts meet customer needs. Outcome reviews include the results, findings, or conclusions of individual program, project, product, and activity evaluations from within the Elementary and Secondary Education Program. These evaluation results should be used as the foundation to guide funding organizations in making adjustments in the Program where appropriate.

Approach includes a rigorous evaluation of projects/deliverables as matched to annual performance goals and targeted program/project outcomes; periodic progress reports on performance metrics; annual performance evaluations using common criteria; and access to performance information for the entire Elementary and Secondary Education Program portfolio.

All projects funded under the Elementary and Secondary Education Program will be required to undergo the following reporting and review activities.

- Annual performance planning and reporting is required and annual performance goals are to be identified, measured and monitored throughout the fiscal year.

- Monthly reports are submitted and quarterly reviews are held.

- Annual review with results of the review used to develop an improvement plan to be integrated within its next annual performance plan.

- Submission to the online Weekly Activity Report is encouraged.

- Continuous input to the Education database, NEEIS, for capturing annual data and metrics to support Agency-wide roll up and reporting is expected.

More complete description of the review and reporting elements are listed, below.

- **Weekly Activity Report (WAR)**

  Projects are encouraged to utilize the online Weekly Activity Reporting tool to communicate key events/activities that have happened during week or key events expected to happen in the near term. A 90-day report is assembled for the NASA

Administrator on a monthly basis and items that look forward over the 90-day period are compiled into this report for the Administrator and shared with the Agency Senior Leadership.

- **Monthly Status**

  By the final Wednesday of each month, each project shall submit a status brief. The brief shall provide explanation within the four areas of Cost, Schedule, Technical, and Management Issues and using the (green, yellow, and red) color key, provide status with explanations. In addition, accomplishments for the time period should be listed. This status will be used to input progress into ERASMUS and to assess overall monthly status of the Elementary and Secondary Education Program to report to the AA for Education.

- **Quarterly Review**

  The projects shall undergo review each quarter of the progress. Quarterly reviews shall be conducted by Program/Project Manager. The reviews shall consist of a demonstration of the state of the project's technology and deliverables, an assessment of the project's status relative to its schedule, and an evaluation and possible adjustment of the project's direction and deliverables.

- **Semi-annual Review of Performance**

  Project funding shall be evaluated mid-year (prior to start of third quarter of the fiscal year) relative to the demonstrated performance of the project team and to the educational value of the project's technology.

- **Annual Review of Performance**

  Reviews will be based primarily on written documentation summarizing the goals, objectives, organization, resources, and accomplishments of each Project. The results of the review will be used to develop an improvement plan to be integrated within its next annual performance plan.

The final review will address the six criteria. These principles are:

- ***Relevance:*** To effectively strengthen the Nation's STEM workforce, NASA must implement activities that are useful to the education community and that strengthen their ability to engage students in the STEM pipeline.
- ***Content:*** Education investments use NASA content, people or facilities to involve educators, students, and/or the public in NASA science, technology, engineering, and mathematics.
- ***Diversity:*** NASA strives to ensure that underrepresented and underserved students participate in NASA education and research programs to encourage more of these students to pursue STEM careers. Programs and projects are representative of American demographics, engage underrepresented and underserved minorities, women, and persons with disabilities, and reflect an atmosphere of equity, balance, and inclusiveness. NASA will continue to focus on enhancing the capabilities of Minority Serving Institutions to contribute to the research needs of the Agency.
- ***Evaluation:*** Education investments document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and annual performance goals. Evaluation methodology is based on reputable models and techniques appropriate to the content and scale of the targeted activity, product, or program.
- ***Continuity:*** Projects and activities draw from audiences that have already demonstrated interest

in NASA and connect participants to the next level of engagement. A blend of projects and activities encourage continued student affiliation with NASA throughout their academic career.

- ***Partnerships/Sustainability:*** Education investments leverage and achieve sustainability through their intrinsic design and the involvement of appropriate local, regional, and/or national partners in their design, development, or dissemination. As appropriate, key aspects of projects and activities are replicable and demonstrate potential for continuation beyond the period of direct NASA funding.

Finally, the individual E&S Program and projects will be subject to review and assessment per NASA Education guidance articulated under the Strategic Framework and as further communicated based on the results of the Education Coordinating Committee working group on evaluation.

3.11 CONFIGURATION MANAGEMENT PLAN

The NES Project Management will record and report the status of project elements as documented in Sections 3.10 Reviews and 3.1 and 3.2 the Communications and Control plans. The information will be archived as documented in 3.14 Knowledge Capture.

3.12 EDUCATION AND PUBLIC OUTREACH PLAN

This project falls under the umbrella of NASA Education and therefore the complete nature of the project and its scope are education and fall under the guidelines and requirements thereof.

3.13 TERMINATION REVIEW CRITERIA

Project funding shall be evaluated mid-year (prior to start of third quarter of the fiscal year) relative to the demonstrated performance of the project team and to the educational value of the project's technology. Projects not meeting their deliverables, schedule or other commitments, or whose technology has or is clearly becoming obsolete, or has insufficient alignment with NASA education goals and objectives may have their funding reduced or eliminated. Such a proposed action will be forwarded by the Project Manager and acted upon only upon concurrence and/or further direction by the NASA Education Director, Elementary and Secondary Education.

3.14 KNOWLEDGE CAPTURE

Evaluating the effectiveness of NASA Education's portfolio requires on-line, near-real-time access to planning, budgeting, analytical and programmatic information to enable rapid decision-making, corrective actions, and the ability to respond in a timely manner to Agency and external stakeholder requests. The decision-making environment requires that project managers:

- Use one common database and format.

- Assess using same database.

- Trace budget and actual costs through the Agency Education Outcomes with linkage to the NASA Strategic Plan.

- Demonstrate link between budget and both operational and strategic planning.

- Utilize the Agency's Core Financial systems.

It is essential that successful implementation strategies in NES schools and at NES Centers are documented shared across the project. The following occur to ensure knowledge capture:

- Monthly NES Project Meetings
- Weekly NES Coordinator Meetings
- Annual NES Project Meetings
- NES Facilitation Manuals
- NES Training Materials
- NES Annual Evaluation

3.15 WAIVERS/DEVIATIONS LOG

3.16 CHANGE LOG

Document changes to the Project Plan.

Date	Version	Author	Comments

3.17 APPENDICES

Appendix A. Strategic Implementation Framework

Appendix B. FY 2008 Budget Guidance